

An Atypical Outsized Lateral Circumflex Femoral Artery and Its Clinical Implications

ASHWINI S. SHETTY, SHETTY SANTOSH, RAKESH G., NARENDRA PAMIDI, RAGHU JETTI

ABSTRACT

The knowledge on the arterial variations of the lower extremity is extremely important for the vascular surgeons and the interventional radiologists. These variations may not endanger the life of the patients and they are usually subclinical and are found only during surgeries, autopsies and dissections. These variations may be the sources of bleeding at times. The variations which involve the femoral, profunda femoris and the circumflex femoral arteries are important in vascular reconstructive surgeries,

in surgical interventions for embolism, catheterization procedures and in raising skin grafts with pedicles. The variations of the lateral circumflex femoral artery are very much useful in making the anterolateral thigh flaps. Hence, here we are reporting a rare case of an unusual size of the lateral circumflex femoral artery which arose from the femoral artery. The lateral circumflex femoral artery did not pass between the two divisions of the femoral nerve, its branches and termination were found to be normal.

Key Words: Femoral artery, Lateral circumflex Femoral artery, Clinical significance

INTRODUCTION

The Lateral Circumflex Femoral Artery (LCFA) is a branch of the profunda femoris artery. It passes laterally between the anterior and the posterior divisions of the femoral nerve. The artery ends by dividing into the ascending, transverse and the descending branches. The ascending branch anastomoses with the superior gluteal and the deep circumflex iliac arteries, and it supplies the greater trochanter, the head and the neck of the femur. The descending branch anastomoses with the lateral superior genicular branch and it takes part in the anastomosis around the knee joint. The transverse branch forms the cruciate anastomosis [1]. The LCFA plays a pivotal role in the anterolateral thigh flaps and in the tensorfasciata myocutaneous flaps. The variations of this artery and its branches are very important for plastic surgeons [1]. The LCFA arose from the femoral artery in 81.25% patients and from the profunda femoris artery is 18.75% patients in the Indian population [2].

CASE REPORT

During the regular dissection classes which were held for first year medical students, an embalmed male cadaver which was 50 years of age showed an abnormal size and origin of the LCFA in the right lower extremity. The LCFA arose from the lateral aspect of the femoral artery, proximal to the origin of the profunda femoris artery, one cm below the inguinal ligament [Table/Fig-1]. The artery was 0.25cm in size when it was measured at its origin and then the LCFA passed downwards, parallel to the femoral artery. The diameter of the LCFA was unusually large. It was almost close to the diameter of the profunda femoris artery and the LCFA did not pass between the divisions of the femoral nerve. It gave ascending, transverse and descending branches and in addition to these, it gave several muscular branches which supplied the thigh muscles. The medial circumflex femoral artery arose from the profunda femoris artery, it was normal in its course, size and length. The other lower extremity showed a normal course, size and length of the LCFA.



[Table/Fig-1]: LCFA: Lateral circumflex femoral artery, FA: Femoral artery, PFA: Profunda femoris artery, MCFA: Medial circumflex femoral artery.

DISCUSSION

The arterial variations of the lower limb, especially the femoral artery, has gained popularity recently, because of its close association with the repair of femoral hernias and because of its common use in coronary angiographies. Several variations of the femoral artery and the profunda femoris artery had been reported in the past, such as the duplication of the profunda femoris artery and the abnormal course of the profunda femoris, which passed in front of the femoral vein [3]. Here, we are reporting the abnormal origin, course and the size of the lateral circumflex femoral artery. Vazquez et al., [4] studied 221 embalmed cadavers and classified the patterns of the circumflex femoral arteries into type 1: both the circumflex arteries arise from the profunda femoris artery. Type 1a: the origin of the medial circumflex femoral artery (MCFA) is more proximal than that of the LCFA. Type 1b: the origin of the LCFA is proximal to that of the MCFA. Type 1c: both the arteries arise from

the common trunk. In type 2, one of the arteries arises from the femoral artery and the other one arises from the profunda femoris artery. In type 2a: the MCFA arises from the femoral artery and in the type 2b, the LCFA arises from the femoral artery. In type 3, both the arteries arise from the femoral artery. In their study, Samarawickrama et al. [5] found the origin of the LCFA to be from the profunda femoris artery in 92.3% of the population, which was similar to that in the Turkish population (77.3%) [6]. The arteries of the lower limb develop from the axis artery, which is derived from the fifth lumbar artery. In the developmental process, some of the channels regress and some of them enlarge and form a definitive arterial pattern. The persistence of the channels that are supposed to disappear, lead to various vascular anomalies [7-9].

The arterial variations of the lower limb, especially the femoral vessels, are very much vital for surgeons during femoral hernia repair and surgeries which are done in the femoral triangle [4]. These kinds of variations are very important for interventional radiologists during procedures like angiography, Colour Doppler and digital subtraction angiography. They may complicate arteriectomies, embolectomies and thromboendarterectomies in cases of atherosclerosis, which are most commonly seen in the lower limb vessels [10-12]. As the lateral circumflex femoral artery is very large and unusual in size, it may complicate the procedures of coronary angiography and stent procedures, since the femoral artery was the choice for those procedures. As the artery is big, it may carry a significant amount of blood to the femoral neck and to the muscles and the skin over the thigh. It has the advantage of raising the anterolateral thigh flap and since the blood supply is more, there will be less chances of flap necrosis. The anterolateral thigh flap is the most preferred choice in reconstructive surgeries [13]. Hence in conclusion, the LCFA is an important branch of the profunda femoris artery and its variations need great attention from the academicians and clinicians.

REFERENCES

- [1] Standring S. Gray's anatomy. The Anatomical Basis of the Clinical Practice. 40th edition. Spain: Churchill Livingstone Elsevier; 2008; 1380.
- [2] Prakash, Kumari J, Kumar Bhardwaj A, Jose B A, Kumar Yadav S, Singh G. Variations in the origins of the profunda femoris and the medial and the lateral femoral circumflex arteries: a cadaver study in the Indian population. *Rom J Morphol Embryol* 2010, 51 (1): 167-70.
- [3] Sahin B, Bilgic S. Two rare arterial variations of the deep femoral artery in newborns. *Surg Radiol Anat* 1998, 20(3):233-235.
- [4] Vazquez MT, Murillo J, Maranillo E, Parkin I, Sanudo J. The patterns of the circumflex femoral arteries revisited. *Clin Anat* 2007; 20: 180-85.
- [5] Samarawickrama MB, Nanayakkara BG, Wimalagunaratna KWR, Nishantha DG, Walawage UB. The branching pattern of the femoral artery at the femoral triangle: a cadaver study. *Galle Medical Journal* 2009; Vol 14, no 1: 31-34.
- [6] Uzel M, Tanveli E, Yildirim M. An anatomical study on the origins of the lateral circumflex femoral artery in the Turkish population. *Folia Morphol (Warsz)* 2008; 67(4):226-30.
- [7] Lippert H, Pabst R. The Arterial Variations in Man: Their Classifications and Frequencies. *Bergmann Munchen* 1985; 54-61.
- [8] Sahn DJ, Goldenberg SJ, Allen HD, Valdes-Cruz LM, Canale JM, Lanje L, et al. A new technique for the noninvasive evaluation of the femoral arterial and the venous anatomies before and after percutaneous cardiac catheterizations in children and infants. *Am J Cardiol* 1982; 49:349-55.
- [9] Sanudo JR, Roig M, Rogrigues A, Ferreira B, Domenech JM. The rare origins of the obturator inferior epigastric and the medial circumflex femoral arteries from a common trunk. *J Anat* 1993; 183: 161-63.
- [10] Bozer YA, Guray II. Vascular diseases and surgery, Ankara: Hacettepe University Publications. 1984.
- [11] Dear U. General Surgery, Istanbul, Turkey, Bayda. 1983.
- [12] Linder HH, Clinical anatomy. New York, USA: Prentice Hall International Inc. 1989.
- [13] Tansatit T, Wanidchapholoi S, Sanguansit P. The anatomy of the lateral circumflex femoral artery in the anterolateral thigh flap. *J Med Assoc Thai* 2008; 91(9): 1404-09.

AUTHOR(S):

1. Dr. Ashwini S. Shetty
2. Dr. Shetty Santosh
3. Dr. Rakesh G.
4. Dr. Narendra Pamidi
5. Dr. Raghu Jetti

PARTICULARS OF CONTRIBUTORS:

1. Department of Anatomy, Yenepoya Medical College, Yenepoya University, Mangalore, Karnataka, India.
2. Karnataka Ayurveda Medical College, Mangalore, Karnataka, India.
3. Department of Anatomy, Kasturba Medical College, International Centre, Manipal University, Manipal, Karnataka, India.
4. Department of Anatomy, Melaka Manipal Medical College, Manipal University, Manipal, Karnataka, India.
5. Department of Anatomy, Melaka Manipal Medical College, Manipal University, Manipal, Karnataka, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Raghu Jetti
Department of Anatomy,
Melaka Manipal Medical College (Manipal campus),
Manipal University, Manipal, 576104,
Karnataka, India.
Phone: 91-820-2922635; Fax: 91-820-2571905.
E-mail: raghujetti@yahoo.co.in

FINANCIAL OR OTHER COMPETING INTERESTS:

None.

Date of Submission: **Mar 05, 2012**
Date of Peer Review: **Jun 08, 2012**
Date of Acceptance: **Aug 09, 2012**
Date of Publishing: **Sep 30, 2012**